

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Inventor: Kazuyuki MIYA et al. Art Unit 2455
Appln. No.: 10/069,480 Exr. S. Ismail
Filed: February 27, 2002 Conf. No. 3434
For: FAST PACKET TRANSMISSION SYSTEM

RESPONSE UNDER 37 CFR § 1.116

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the Final Rejection dated December 9, 2008, the Applicants respectfully request reconsideration and allowance of this application in light of the following remarks.

Claims 38, 39, 42-47 and 50 stand rejected, under 35 USC §103(a), as being unpatentable over Mohebbi (US 6,889,046) in view of Nakajima et al. (US 5,940,769). Claims 40, 41, 48, and 49 stand rejected, under 35 USC §103(a), as being unpatentable over Mohebbi in view of Nakajima and Parkvall et al. (US 6,542,736). The Applicants respectfully traverse these rejections based on the following points.

Claim 38 defines a transmission system having a communication terminal and a plurality of base stations. The communication terminal communicates: (1) acknowledgment or negative acknowledgment (ACK/NACK) information to the base stations indicating whether an error was detected in a received packet, (2) request packet number information indicating the packet

number of a packet that is requested to be communicated in a next transmission unit, and (3) base station selection information indicating a selected one of a plurality of base stations. The selected base station determines a transmission target-packet based on the received ACK/NACK information and the requested packet number information and communicates the determined packet to the communication terminal.

The claimed subject matter supports the ability for all base stations communicating with a communication terminal to know the number of the next packet to be transmitted to the communication terminal. Thus, as the propagation environment changes during the communication of a sequence of packets and different base stations are selected to communicate some of the packets, each of the selected base stations will know which packet in the sequence is to be communicated next (see paragraphs [0027] and [0028] of the published specification).

The Final Rejection acknowledges that Mohebbi does not disclose communicating packet number identifying information from a mobile station to a base station (see Final Rejection page 4, lines 2-7). To overcome this deficiency, the Final Rejection proposes that Nakajima discloses a base station that retransmits a previously transmitted packet when a NAK signal is received from a communication terminal and transmits a packet that the base station has not previously transmitted, from a sequence of packets, when an ACK signal is received (see page 4, penultimate paragraph, and paragraph bridging pages 6 and 7). The Final Rejection further proposes that Nakajima's ACK signal inherently indicates that a next packet in the sequence is to be transmitted subsequently and that Nakajima's NACK signal inherently indicates that the previously transmitted packet is to be retransmitted subsequently (see page 7, second paragraph).

Although Nakajima's ACK and NACK signals may inherently indicate whether a previously transmitted packet or not-previously transmitted packet is to be transmitted subsequently, as proposed in the Final Rejection, these signals do not provide any indication of a packet's sequence number. Nothing within the ACK and NACK signals provides any information as to whether a packet requested for transmission is the third, tenth, nineteenth, etc. packet in a sequence. And the Final Rejection does not propose otherwise; instead, the Final Rejection merely proposes that the NACK/ACK signals indicate whether a packet previously/not previously transmitted by the base station is to be transmitted next.

Claim 38 recites: (1) a communication terminal that communicates packet number information indicating the packet number of a packet that is requested to be transmitted in a next transmission unit and (2) that one of a plurality of base stations determines a packet to transmit in a next transmission unit based on the packet number information. Indicating whether a previously transmitted packet or not-previously transmitted packet is to be transmitted next, as the Final Rejection proposes to be inherently disclosed by Nakajima, is not the same as the claimed subject matter of communicating information indicating the packet number of a packet that is to be transmitted next.

Thus, it is submitted that the individual or combined teachings of Mohebbi and Nakajima would not support a system in which each of a plurality of base stations communicating with a communication terminal would recognize, from a single feedback message, which packet the communication terminal wishes to receive in a next transmission unit, as does the claimed subject matter. Instead, the base stations taught by Mohebbi and Nakajima would have to keep track of all communicated downlink packets and all feedback ACKs/NACKs to determine which

packet is to be communicated next, which would be difficult or impossible for a communication terminal potentially moving in and out of range for some of the base stations.

The Applicants' claimed subject matter supports distributing packet scheduling functionality among a plurality of base stations. Since each base station may have no direct knowledge of the packets other base stations have sent to a communication terminal, the claimed communication terminal provides each of the base stations with information indicating the packet number of the packet to be sent next and a selected base station communicates the indicated packet. Mohebbi and Nakajima fail to disclose this subject matter.

Accordingly, the Applicants respectfully submit that the teachings of Mohebbi and Nakajima, considered individually or in combination, do not render obvious the subject matter defined by claim 38. Independent claim 46 similarly recites the above-mentioned subject matter distinguishing apparatus claim 38 from the applied references, but does so with respect to a method. Independent claims 43 and 44 recite the above-mentioned distinguishing subject matter of the base station apparatus and communication terminal apparatus, respectively. Therefore, the rejections applied to claims 40, 41, 48, and 49 are obviated, and allowance of claims 38, 43, 44, and 46 and all claims dependent therefrom is warranted.

To promote a better understanding of the patentable distinctions of the Applicants' claimed subject matter over the applied references, the Applicants provide the following additional remarks.

Features of the Applicants' claimed invention include: (1) communicating, to a plurality of base stations, at a communication terminal: (a) acknowledgement or negative acknowledgement information indicating whether an error is detected in a received packet, (b)

request packet number information indicating the packet number of a packet that is requested to be communicated in the next transmission unit, and (c) base station selection information indicating a selected base station and (2) at a selected one of the plurality of base stations: (d) determining a transmission target packet based on the acknowledgement or negative acknowledgement information and the request packet number information and (e) communicating the packet to the communication terminal.

The Final Rejection proposes that Nakajima discloses ACK/NACK information that has a function of indicating the packet number of a packet that is requested to be communicated in a next transmission unit (see Final Rejection page 7, second paragraph). The Applicants respectfully disagree.

Nakajima is related to a basic automatic retransmission control in one-to-one communication. To be more specific, when a first station (equivalent to a base station of the claimed invention) receives an ACK from a second station (equivalent to the communication terminal of the claimed invention) after transmitting the N-th data packet, the first station then transmits the (N+1)-th data packet. On the other hand, when the first station receives a NACK from the second station after transmitting the N-th data packet, the first station then retransmits the N-th data packet.

Although the above-described automatic retransmission control does not cause any trouble in a one-to-one communication, when a base station selected from a plurality of base stations of the claimed invention transmits a packet to a communication terminal, such automatic retransmission control may cause trouble. As an example, it is assumed that communication is performed between a first base station, a second base station, and a communication terminal and

that the first base station is selected first. If the selected first base station transmits the N-th packet and the communication terminal can receive the packet correctly, the communication terminal transmits an ACK to each base station. Because the first base station is selected, it may be presumed that channel quality between the first base station and the communication terminal is good and that channel quality between the second base station and the communication terminal is not good. Therefore, although an ACK transmitted from the communication terminal is received correctly at the first base station, the ACK may be received wrongly at the second base station and, consequently, the second base station may determine that a NACK was received. In this case, as in Nakajima, if ACK/NACK information alone is transmitted from the communication terminal, the second base station is then ready to retransmit the N-th packet. Next, when the second base station is selected, although the N-th packet has been already received at the communication terminal correctly, the second base station transmits the N-th packet.

By contrast with this, as in the Applicants' claimed invention, if the communication terminal transmits request packet number information indicating the packet number of a packet that is requested to be communicated in the next transmission unit in addition to ACK/NACK information, the second base station can then transmit the (N+1)-th packet. The above-described content is explained in detail in Figs. 3 and 9 and their supporting descriptions in the specification. (References herein to the specification and drawings are for illustrative purposes only and are not intended to limit the scope of the invention to the referenced embodiments.)

Further, although both ACK/NACK information and request packet number information may be received wrongly at a base station that is not selected, this probability is much lower than

the probability that a communication terminal transmits only ACK/NACK information and this ACK/NACK information is received wrongly.

As described above, according to the Applicants' claimed invention, by transmitting both ACK/NACK information and request packet number information at a communication terminal, base stations can determine the packet number of a next packet that is transmitted according to the request packet number information even if the base stations receive an ACK signal wrongly, so that the present invention overcomes the problem that the order of packets to be transmitted is not correct.

In view of the above, it is submitted that this application is in condition for allowance, and a notice to that effect is respectfully solicited.

If any issues remain which may best be resolved through a telephone communication, the Examiner is requested to telephone the undersigned at the local Washington, D.C. telephone number listed below.

Respectfully submitted,

/James Edward Ledbetter/

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JEL/DWW/att

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